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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/752,134	12/27/2000	Gilbert Neiger	042392.P9770	8719

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EXAMINER

SCHUBERT, KEVIN R

ART UNIT	PAPER NUMBER
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2137

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/752,134

Applicant(s)

NEIGER, GILBERT

Examiner

Kevin Schubert

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11082004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

Claims 1-30 have been considered

### *Information Disclosure Statement*

5           It should be noted that the applicant has submitted an exorbitant amount of prior art on numerous PTO-1449's which, on initial consideration, do not all appear to have relevancy or pertinence to the instant invention as claimed. The applicant is requested in response to this office action to point out which of these numerous prior art are pertinent or relevant to the patentability of the invention as claimed in this instant application. It should be noted that it would be advantageous to the applicant to provide a  
10   concise explanation of why each of the prior art is being submitted and how it is understood to be relevant. "Concise explanations are helpful to the Office, particularly where documents are lengthy and complex and applicant is aware of a section that is highly relevant to patentability or where a large number of documents are submitted and applicant is aware that one or more are highly relevant to patentability." (See MPEP 609 under subheading "A. CONTENT").

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### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

20           (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

25           Claims 1-2,5-9,15-16,19-23, and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Robinson, U.S. Patent No. 5,522,075.

As per claims 1,15, and 28, the applicant describes a method comprising the following limitations which are met by Robinson:

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a) running guest software in a processor mode that enables the guest software to operate at a privilege level intended by the guest software (Col 14, lines 12-15);

b) responsive to an attempt of the guest software to perform an operation restricted by said processor mode, exiting said processor mode to transfer control over the operation to a VMM running  
5 outside said processor mode (Col 12, lines 50-60);

As per claims 2, 16, and 29, the applicant describes the method of claims 1, 15, and 28, which are met by Robinson (see above), with the following limitations which are also met by Robinson:

a) responding to the operation (Col 12, lines 50-60);  
10 b) transferring control over the operation to the guest software by entering said processor mode (Col 12, lines 50-60).

As per claims 5 and 19, the applicant describes the method of claims 1 and 15, which are met by Robinson (see above), with the following limitation which is also met by Robinson:

15 Wherein exiting said processor mode further comprises automatically transferring from an address space associated with the guest software to an address space associated with the VMM (Col 12, lines 50-60; Col 11, lines 14-15).

As per claims 6 and 20, the applicant describes the method of claims 1 and 15, which are met by  
20 Robinson (see above), with the following limitation which is also met by Robinson:

Maintaining a flag in a processor control register to indicate whether the processor is in said processor mode (Col 12, lines 50-60).

As per claims 7 and 21, the applicant describes the method of claims 1 and 15, which are met by  
25 Robinson (see above), with the following limitation which is also met by Robinson:

Further comprising reporting an ability of a processor to support said processor mode using one of a plurality of reserved feature bits that are returned in a processor register (Col 12, lines 50-60).



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Wherein entering said processor mode includes loading processor state expected by the guest software (Lim: Col 6, lines 53-65);

Robinson discloses all the limitations of claims 2 and 16. However, Robinson does not disclose the use of loading the processor state expected by the guest software when the processor mode returns  
5 to the VM from the VMM.

Lim discloses the use of checkpointing whereby a processor state used by the guest software is saved before control is transferred to the VMM so that the saved processor state can be resumed when control transfers back to the guest software. It would have been obvious to one of ordinary skill in the art at the time the invention was filed to combine the ideas of Lim with those of Robinson and save and load  
10 the processor state expected by the guest software because doing so allows the guest software to pick up where it left off when control is returned to it.

Claims 10,24, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson in view of Collins (Collins, Robert R. Details of Intel's Virtual Mode Extensions. March 1998).

15 As per claims 10,24, and 30, the applicant describes the method of claims 8,22, and 28, which are met by Robinson (see above), with the following limitationd which are met by Collins:

a) maintaining a redirection bitmap for the plurality of the interrupts and exceptions, the redirection bitmap indicating whether each of the plurality of the interrupts and exceptions is allowed to be  
20 handled by the guest software (Collins: page 3);

b) consulting the redirection bitmap to determine whether to exit said processor mode (Collins: page 7);

Robinson discloses all the limitations of claims 8,22, and 28. However, Robinson fails to disclose the use of a redirection bitmap for keeping track of which interrupts and exceptions are allowed and which  
25 interrupts and exceptions should trigger transferring control to the VMM.

Collins discloses the use of a redirection bitmap as an efficient way to keep track of interrupts and exceptions. It would have been obvious to one of ordinary skill in the art at the time the invention was

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filed to combine the ideas of Collins with those of Robinson and add the use of a redirection bitmap for efficiently keeping track of interrupts and exceptions.

Claims 11-12, 14, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson in view of Rozycki (Rozycki, Maciej W. Protected Mode Virtual Interrupts (PVI) on Pentium and SL-enhanced i486 Intel processors. 1996).

As per claims 11 and 25, the applicant describes the method of claims 8 and 22, which are met by Robinson (see above), with the following limitation which is met by Rozycki:

- a) identifying an attempt of the guest software to modify an interrupt flag (Rozycki: page 1);
- b) modifying the interrupt flag if the interrupt flag does not control masking of interrupts (Rozycki: page 3);

Robinson discloses all the limitations of claims 8 and 22. However, Robinson fails to teach that the guest software attempts to modify an interrupt flag of that the interrupt flag is modified if it does not control masking of interrupts.

Rozycki teaches identifying an attempt of guest software to modify an interrupt flag: "To ensure protection and accessibility at the same time, a special two-bit field called IOPL was introduced into the EFLAGS register... In this way, disabling of access to these instructions can be achieved. Additionally, to prevent user-level code from changing the IOPL field, POPF or IRET do not modify it when executed at CPL > 0" (page 1, paragraph 2). Thus, in order to prevent the user from making modifications, there is a step of identifying a user or guest attempt to make modifications.

Furthermore, Rozycki teaches modifying the interrupt flag if the interrupt flag does not control masking of interrupts. Rozycki discloses a technique whereby a flag is checked and based upon its value appropriate action is taken and where it is possible to execute some system level programs or procedures at the application level. Such is the scenario described by the applicant in the thirty-fourth paragraph of the Description of Embodiments whereby a flag is checked and based upon its value appropriate action is taken to modify or not modify the flag.

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As described by Rozycki in the Introduction, identifying attempts of the guest to modify interrupt flags and modifying interrupt flags if they do not control masking are good ways to ensure protection and accessibility at the same time. It would have been obvious to one of ordinary skill in the art at the time the invention was filed to combine the ideas of Rozycki with those of Robinson because adding the step of  
5 monitoring an attempt by guest software to make modifications to an interrupt flag makes a system more secure.

As per claims 12 and 26, the applicant describes the method of claims 8 and 22, which are met by Robinson (see above), with the following limitations which are met by Rozycki:

- 10       a) identifying an attempt of the guest software to modify an interrupt flag (Rozycki: page 1);  
         b) preventing the attempt of the guest software to modify the interrupt flag (Rozycki: pages 2 and  
3).

As per claim 14, the applicant describes the method of claim 12, which is met by Robinson in  
15 view of Rozycki (see above), with the following limitation which is met by Rozycki:

Wherein preventing the attempt of the guest software to modify the interrupt flag includes generating one of the plurality of interrupts and exceptions in response to the attempt of the guest software to modify the interrupt flag (Rozycki: page 2).

20       Claims 13 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson in view of Rozycki in further view of Walker (Walker and Cragon. Interrupt Processing in Concurrent Processors. June 1995. Computer. pages 36-46).

As per claims 13 and 27, the applicant describes the method of claims 12 and 26, which are met  
25 by Robinson in view of Rozycki (see above), with the following limitation which is met by Walker:

wherein preventing the attempt of the guest software to modify the interrupt flag includes providing a shadow interrupt flag for modifications by the guest software (Walker: page 7);



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Robinson in view of Rozycki meet all the limitations of claims 12 and 26 (see above). Robinson in view of Rozycki fail to teach the use of shadow flags to prevent the attempt of guest software to modify the interrupt flag.

Walker discloses that the use of shadow registers is a good way to further limit the manipulation of the actual registers because the original state of the actual register is maintained while the shadow state is being manipulated. It would have been obvious to one of ordinary skill in the art at the time the invention was filed to combine the ideas of Walker with those of Robinson in view of Rozycki because adding the use of shadow flags further protects a system.

#### ***Response to Arguments***

Applicant's arguments, see Remarks, filed 1/25/05, with respect to the rejection(s) of claim(s) 1, 15, and 28 under Lim, U.S. Patent No. 6,795,966, have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Robinson, 5,522,075.

#### ***Conclusion***

**THIS ACTION IS MADE NON-FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Schubert whose telephone number is (571) 272-4239. The examiner can normally be reached on M-F 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571) 272-3868. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should  
5 you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**ANDREW CALDWELL**  
**SUPERVISORY PATENT EXAMINER**

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